

ISSUES IN JEWISH CONTEMPORARY SOCIETY

THE AGE OF THE UNIVERSE

סמנר מדרשת רחל וחייה

A] INTRODUCTORY ISSUES

- 1) Science and Torah both come from Hashem and **to the extent that they are talking about the same thing** they should not contradict
- 2) Historically, up to about 600 years ago there was no perceived intrinsic conflict between science and Torah - physics and metaphysics - see Rambam, Ralbag etc. What caused the split? Roger Bacon (13C England) and the scientific emphasis on empiricism - that **science can only deal with observable phenomena in the natural world** - to the exclusion of logic, metaphysics etc. This puts modern science and Torah on two different agendas
- 3) If there an apparent clash between science and Torah there are 3 basic approaches to deal with this:-
 - (i) maybe we have misunderstood the science. We must never regard science as an **absolute** against which Torah must be made to fit. Much (although probably not all) 20C science will be overturned by the end of the 21C;
 - (ii) maybe we have misunderstood the Torah. Assume that Torah is MUCH more sophisticated than you think!
 - (iii) maybe they are both correct but are looking at different questions - science is 'how', Torah is 'why'. They are working on different levels of reality
- 4) The basic premise of science - that there are consistent rules of nature and the search to harmonize them and ultimately find a Grand Unified Theory (uniting quantum theory and gravitational theory) - stems from a basic Jewish monotheistic premise - the Unity of Hashem. Polytheism sees the universe as chaotic conflicting forces. Judaism sees conflicts and contradictions as superficial only. Underpinning them are ever simpler foundations ultimately emanating from one stem - the Etz Hachaim
- 5) It is remarkable that not only does the universe work in a consistent and predictable way but its methodology is accessible to the human brain through mathematics. Man and the universe appear to be on the same 'wavelength' such that cracking the codes of reality is sufficiently complex to attract the greatest human brains and yet simple enough for them to succeed enough to keep them interested!

B] CAN WE JUST IGNORE THE THEOLOGICAL IMPLICATIONS OF SCIENCE?

- 1) Some science is based on readily observable and predictable phenomena. It is highly unlikely that this will ever be overturned - e.g. that science will in the future decide that the earth is flat and is the center of the universe. However, Newtonian physics works in the observable world but has been found to be inapplicable on a subatomic level and we cannot ever say that science will not discover more fundamental principles which contradict today's standard models
- 2) Some science is much more theoretical. It should be treated more carefully and with a strong caveat that it may well be overturned in future years
- 3) Historically, most Torah authorities, including modern thinkers such as R. Yosef Ber Soloveitchik have seen Torah and science as two entirely separate fields and have therefore not felt the need to reconcile them.
- 4) However, others have felt that it was incumbent upon us to try and explain how science and Torah fit together e.g.
 - (i) Rav S.R. Hirsch (19C Germany) shows how the then-new sciences of evolution and geology could be reconciled with Torah even though he was skeptical of them. He states that if they became accepted by the scientific community we would be obliged to try to understand them in light of Torah
 - (ii) One of the greatest philosophical battles between Western (Greek) and Jewish philosophies over the last 3000 years is the Platonic position of *kadmut haolam* (the eternity of the matter comprising the universe) -vs- the Torah position of *briat haolam*. The Greeks and all Western science up to the mid 20C believed that the universe had no beginning but was eternally old. The Jews believed in creation *ex nihilo*: a point of creation from nothing.

(Today the entire scientific world has come to accept the Big Bang Theory which moves the Western thinking substantially closer to Jewish thought, although not entirely, since science still tries to explain the causation of the Big Bang within whatever laws of physics existed at that time).

The Rambam entirely rejects kadmut haolam and write at length in Moreh Nevuchim disproving it. However he also writes:-

1. If, however, we accepted the Eternity of the Universe in accordance with Plato ... we would not be in opposition to the fundamental principles of our religion; ... The Scripture might have been explained accordingly and many expressions might have been found in the Bible and in other writings which would confirm and support this theory. But there is no necessity for this expedient as long as the theory has not been proved.

Moreh Nevuchim 2:25

5) If people are not bothered by questions (either due to firm emuna or willful or unwillful ignorance) it is inappropriate to introduce them to such questions, even if we feel there that there are satisfactory answers. On the other hand, ignoring or suppressing questions or conflicts that people already have is intellectually dishonest and ultimately counterproductive.

2. When I have a difficult subject before me - when I find the road narrow and can find no other way of teaching a well established truth except by pleasing one intelligent man and displeasing ten-thousand fools - I prefer to address myself to the one man, and take no notice whatever of the condemnation of the multitude. I prefer to extricate the intelligent man from his embarrassment and show him the cause of his perplexity, so that he may attain perfection and be at peace.

Moreh Nevuchim - preface

C] EVIDENCE FOR AN ANCIENT UNIVERSE

1) The Torah states that Adam Harishon was created 5771 years ago and the creation of the rest of the universe took 6 days before that. Thus the age of the universe is 5771 years + 6 days.

2) Scientists are unanimous that the universe is much older than that. Estimates vary from between 10 and 20 **billion** years. This date is not arrived at through a theoretical construct but by observable evidence from a variety of sources which all validate this estimate.

3) The evidence includes:-

(i) The observable existence of galaxies billions of light years away. Assuming the constancy of the speed of light, these galaxies existed billions of years ago

(ii) Radioactive dating of elements found in rocks, particularly using rubidium and strontium (Rb-87 decays into Sr-87 with a half-life of 47 billion years) When applied to rocks on the surface of the Earth, the oldest rocks are about 3.8 billion years old. When applied to meteorites, the oldest are 4.56 billion years old. This is understood to be the age of the Solar System.

(iii) measuring the luminosity of old star clusters gives ages of around 12 billion years

(iv) measuring the cooling of white dwarf stars gives an age for our galaxy, the Milky Way of around 9.5 billion years

(v) On a more theoretical basis, the observable expansion of the universe (seen by red-shift in the more distance stars) can be extrapolated using the Hubble Constant to a point of the original Big Bang about 15 billion years ago

(vi) Measured erosion and accumulation of rock and space dust on the moon indicate an age of around 4-4.5 billion years

(vi) different eras evident from rock strata which show that different types of species existed at different times - fossils of aquatic creatures in today's mountain ranges, different dinosaurs at different times

(vii) dendochronology - tree rings - show chronologies going back up to 12,000 years

(viii) ice cores (laid down every year) show layers going back over 100,000 years

- (ix) varve analysis - sediment layers laid down yearly at the base of lakes - show histories of tens of thousands and in some cases millions of years
- (x) Huge stalactites, stalagmites, and columns in the Carlsbad Caverns in New Mexico
- (xi) Thickness of coral reefs
- (xii) Reversals of the Earth's magnetic poles as evidenced by Atlantic Sea bottom
- (xiii) Erosion of the Grand Canyon

D] APPROACH 1 - THE WORLD WAS MADE LOOKING OLD

This accepts the scientific analysis but claims that Hashem made the world to look in an an 'adult' state whereas in fact it is only 5771 years old

3. The argument from the discovery of fossils is by no means conclusive evidence of the great antiquity of the earth, for the following reasons:
- (a) In view of the unknown conditions which existed in "prehistoric" times, conditions of atmospheric pressures, temperatures, radio-activity, unknown catalyzers, etc., etc. as already mentioned, conditions that is, which could have caused reactions and changes of an entirely different nature and tempo from those known under the present day orderly processes of nature, one cannot exclude the possibility that dinosaurs existed 5722 years ago, and became fossilized under terrific natural cataclysms in the course of a few years rather than in millions of years, since we have no conceivable measurements or criteria of calculations under those unknown conditions.
- (b) Even assuming that the period of time which the Torah allows for the age of the world is definitely too short for fossilization (although I do not see how one can be so categorical), we can still readily accept the possibility that God created ready fossils, bones or skeletons (for reasons best known to Him), just as He could create ready living organisms, a complete man, and such ready products as oil, coal, or diamonds, without any evolutionary process. As for the question, if it be true as above (b) why did God have to create fossils in the first place? The answer is simple: We cannot know the reason why God chose this manner of creation in preference to another, and whatever theory of creation is accepted, the question will always remain unanswered. The question, Why create a fossil? Is no more valid than the question, Why create an atom? Certainly, such a question cannot serve as a sound argument, much less as a logical basis, for the evolutionary theory.

Rabbi Menachem M. Schneersohn, A letter on Science and Judaism

4. דאמר רבי יהושע בן לוי: כל מעשה בראשית בקומתן נבראו (רש"י - וביינו עץ פרי - ראוי כיב לטעון פרי מיד)

ראש השנה יא.

The Gemara states that the creation was made in a fully mature state. The tree had mature fruit and, presumably, pre-existing tree rings

5. וַיִּצְרֶה אֱלֹהִים אֶת-הָאָדָם עֶפְרָיִם מִן-הָאֲדָמָה ... עפר, ר"י בר סימון אומר עופר, עולם על מליאתו נברא. אר"א בר שמעון אף חוה על מליאתה נבראת, אמר רבי יוחנן אדם וחווה כבני עשרים שנה נבראו

בראשית רבה פרשה יד:ז

The Medrash learns from the word 'afar' ('ofer' is a poetic expression for a young man) that Adam and Chava were created as adults aged 20

This argument has been put by R. Avigdor Miller and the last Lubavitcher Rebbe. If Adam was created with a non-existent past, so too the universe was created with a billions of year-old non-existent past, including fossils of animals that never existed.

Questions on this approach

- (i) Adam obviously could not be created as a new-born or indeed as an embryo. But why should G-d try to fool us with pretend fossils?
- (ii) If one says it is a test of faith, why is it a test when the fossils can be explained in other ways (see below)

(iii) There is a principle that the world was not created to fool us. On the contrary, we are meant to see emet through the Creation

6. הכל ברא הקב"ה בעולמו חוץ ממידת השקר שלא ברא

תנא דבי אליהו - אליהו זוטא פרשה ג

Chazal state that the midda of Sheker - falsehood - was not created in this world

7. דאמר רבי חנינא: חותמו של הקדוש ברוך הוא אמת

שבת נה.

Hashem's 'seal' is truth

(iv) How far does this argument go?

- Did Hashem draw the cave-paintings which are 10,000 yrs old or create light on its way to earth which looked as though it had started its journey billions of years earlier?
- What about civilizations that appear to have existed between 6000 and 5000 years ago. Were these people given false memories of previous centuries. This would mean that Hashem was creating false information in the minds of men even after briat haolam
- If the world was created 5771 years ago with a false history, maybe the world was created 5 minutes ago to look as though it had a history etc. Some answer this that 5 mins is arbitrary but 5771 years is not. It is the literal explanation of the pesukim which is certainly a valid approach.

(v) Although this is not a reason to automatically reject it as a true theory, its origin is in the writings of Christian theologian Philip Gosse *Omphalos: An Attempt to Untie the Geological Knot (1857)* and has no basis in classic Jewish sources. It must be noted that Christians have no way to understand the Biblical text other than fundamentalist or rejectionist. We have access to an Oral Tradition

E] APPROACH 2 - THE 6 DAYS OF CREATION RAN AT A DIFFERENT SPEED

This approach is adopted by Rav Shimon Schwab (20C Germany/America) and the Leshem (Rav Eliashiv's grandfather - late 19C early 20C Jerusalem). It proposes that before the creation of Man on day 6 the world did not run at the same pace. In fact, although the six days of creation were indeed six 24 hr periods, the world ran at a such a speed as would take billions of years by our current reckoning. As such the world really is 5771 years old but just squeezed a lot into the first 6 days.

Questions on this approach

- (i) How could everything speed up without destroying life e.g. from atoms and radiation moving at a billion times normal speed? Rav Schwab answers that the whole system was speeded up together and so could function.
- (ii) If so, then when everything speeds up, there is no external fixed reference point to measure 6 'days' . Rav Schwab answers that the Creation Light created at the start was the fixed rising and setting of the 6 days. Everything else was accelerated within that.

F] APPROACH 3 - THE 6 DAYS ARE 6 REAL DAYS AND YET 15 BILLION YEARS AT THE SAME TIME

Building on the analysis of Rav Schwab, Dr. Gerald Schroeder has produced a theory based on the theory of relativity - that the passage of time will differ depending on velocity and gravity. So too each day of creation was a 24 hr day from the perspective of the Creator of the expanding universe at that time.

However from our perspective in a fully enlarged universe these 24 hr periods look much longer. This is similar to drawing a 1cm line on a deflated balloon. When the balloon is gradually inflated the same line may be 5, then 10, then 20 cm long. Using the scientific calculations for the expansion of the universe and gravitational forces, Dr Schroeder comes to the following:

- Day 1 = 24 hrs = 8 billion yrs
- Day 2 = 24 hrs = 4 billion yrs
- Day 3 = 24 hrs = 2 billion yrs
- Day 4 = 24 hrs = 1 billion yrs
- Day 5 = 24 hrs = 0.5 billion yrs
- Day 6 = 24 hrs = 0.25 billions yrs
- 6 days = 6x24 hrs = 15.75 billion yrs**

Questions on this approach

- (i) it is not found in any Torah sources
- (ii) Problems (iii), (iv) and (v) in I] below still need to be answered

See <http://torahexplorer.com/genesis-and-the-big-bluff/> for a review and critique of Dr Schroeder's approach

G] APPROACH 4 - THE WORLD LOOKS OLD BECAUSE OF THE CATACLYSM OF THE FLOOD

Some approaches, especially of 19C writers like the Malbim and the Netziv, sought to explain fossils as a consequence of the cataclysm of the Flood. They represent creatures alive before the flood which were subsequently killed and the bones were fossilized under intense pressure and extreme conditions in a few years instead of millions. Some suggest that the tilt of the world's axis shifted after the flood.

8.

<p>שם, ולמי חשבון כמה היה צריך עד שיוולדו שסחי האדמה שהעולם קדמון מרביא שנים, ושכבר היו בע"ח מימי קדם קודם לזמן היצירה שלנו. וכ"ז הבל וריק, כי בעת המבול פתחה האדמה את לועה ע"י הרעשים שבאו מעומק שאול ותהום רבה והפכה תחתונים למעלה ועליון ם למטה והירידה פגרי הבע"ח עמוק עמוק, ונבקה חכמת הוררשים והחופרים לדעת איכות המהמכה הזאת אשר עשתה נמלא'ת במשך ק"ן יום של עמידת המים, עד שכל הסדרים שסדרו למו החוקרים מאיכות האדמה בכל שטח וכל חשבונותיהם בזה נתבלבלו או וכל השערותיהם ודמיונותיהם ישא רוח יקח הבל, ולו חכמו ישכילו זאת ויראו מעשי ה' ונפלאותיו במצולת שאול איך מחה את כל היקום מעל פני האדמה ויטביעם בשאול תחתית עדי אובד :</p>	<p>ובמערות ונתקיימו יותר, ומבאר וימחו מן הארץ, שהגם שהרבה נשארו עצמותיהם התוקים כמטילי ברזל ולא נמוחו, בכ"ז נמחי מן הארץ כי ע"י שטף המים הובלו הסגרים לתוך העמקים ורובם נבלעו בעמקי תהום, אשר האדמה פתחה את סיה מעומק תהום רבה וירדו כמה אלפים אמה לעמקי שאול, עד שבצאת נח מן התיבה לא מצא שום רושם מסגרי בע"ח ועצמות הענקים ובע"ח הגדולים שהיו קודם המבול. ועדות ה' נאמנה מחכימת פתי להשיב דבר לחכמי הנעלאגיא, שהיפדים בעמקי האדמה ומוצאים עצמות גדולות מענקים ובע"ח גדולים שנאבדו מן הארץ ואינם עוד מימי המבול ואילך, והם פוכיחים מזה קדמות העולם, כי יחשבו את האדמה שעשויה מינים מינים, שבכל עומק ידוע יש מין אדמה אחרת, ויחשבו לפי איכות האדמה שימצאו העצמות</p>
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מלבי"ם בראשית ו:כב

The Malbim (19C) understands that the reasons for the apparent age of the Universe is the cataclysm of the flood

9.

<p>שהארץ החמה שגרו עליה כל בני האדם – אשר השחיתו את דרכם נעתקה מנגד השמש, ותחת מגד תבואות שמש נהיה שם קרח וקסאון ושפמות עולם. זאת שנית בארו חכמינו כי קודם המבול לא נטה השמש במעגלו השנתי כ"ג מעלות מן המשוה לצפון ולדרום כמו שהוא עתה, רק מסלול השנתי היה אז ג"כ על קו המשוה או סמוך לו, וע"כ היו בני אדם חיים ארוכים, כי לא ידעו מנגעי התקופות וסגוי העתים שזה טבה לשנוי האוויר ונגעי בני אדם ומחלותם, והעתק הזה שנעשה בכדור הארץ במצבו נגד השמש שנה את האוויר והמירות והחליש תוקף תאדמה וכחה בהשקף על חיי האדם ובע"ח אשר עליה, וכמ"ש במד' שקודם</p>	<p>(כב) עוד כל ימי הארץ. הנה התברר לחוקרי הסבץ שכדור הארץ שינה מקומו בזמן מן הזמנים, כאשר החופרים במעמקי האדמה בארצות הקרות מצאו עמוק עמוק באדמה עצמות פילים וקופים ויתר ברואים שלא יחיו רק באזור החם, וע"כ שהיה עת שעמד האקלים ההוא קרוב לקו המשוה, וזה עדות שבימי המבול התמוטט כדור הארץ מדרום לצפון והמדינה שעמדה עד העת ההיא תחת קו המשוה באה רחוקה מן המשוה לצפון ונעשה שם אזור הקר, והשנהבים והקופים שחיו באקלים ההוא מצאו שם קבר, וזה אחד מן ההשחתות שהיה לארץ,</p>
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מלבי"ם על בראשית ח:כב

The Malbim (19C) also attributes the discovery of paleolithic finds and apparent major world climate shifts to the changing world axis at the time of the flood

10.

נאמר כי במקרא לשון יצירה ונ"ל לפרש דידוע
 בספורי קורות הטבע דנחלת הנריאה היחה
 הארץ כדורית לגמרי ולא היה לא הר ולא בקעה
 והמונה זו היא טבעית כמו כל עבא השמים וכבר
 אמרו... בירושלמי פ"ג דנדרים חני רשב"ג אין
 מרובע מששה ימי בראשית מפני דמונה זו היא
 היותר שלמה ע"י הקדמת הרב בעל עיקרים.
 ואולם ברבות הימים ע"י הרוחות המסתערות בלי
 הפסק וע"י המבול מים אשר נהווה בארץ
 נסתבבו מזה הרים וגבעות כאשר אנו רואים היום
 בתחמת הארץ אילנות ועלמות חיות שונות. והרבה
 מהם אשר אינם שכיחים באקלימים הללו ולדקו
 מאד דברי הירושלמי שניה הן דלא נאמר כי יצירה
 מכוונת רחוקים:

מחלת צריחו היינו דהר לא היה בתחלת הנריאה
 כלל רק נהווה אח"כ במשך הזמן ואינו נוסל עליו
 לשון יצירה ובריאה רק ע"י השתלשלות חוקי
 הטבע אשר חקק ה' במעשי בראשית והמה
 מסובבים רחוקים:

[מהר"צ חיות]

חידושי מהר"צ חיות נדה כג

The Maharitz Chayot here considers how the geological process of mountain formation can be seen in the pesukim

Questions on this approach

(i) There is no scientific basis for a suggesting that bones could be fossilized in a few years or that the earth shifted axis in this way. It may have been reasonable in 19C scientific terms but any attempt today to bridge the gap between science and creation must be based on modern scientific thinking.

However, it DOES indicate a willingness to try and grapple with these issues based on the science of the day and not to try and simply ignore the problem

H] APPROACH 5 - THERE WERE WORLDS PRIOR TO OUR CREATION

This approach is adopted by Rav Ariyeh Kaplan. It brings from classical source to show that the present world may be 5771 years old but there were billions of years of prior 'worlds' before ours.

11. אר"י בר סימון יהי ערב אין כתיב כאן, אלא ויהי ערב. מכאן שהיה סדר זמנים קודם לכן. א"ר אבהו מלמד שהיה בורא
 עולמות ומחריבן, עד שברא את אלו. אמר דין הניין לי, יתהון לא הניין לי. א"ר פנחס טעמיה דר' אבהו וירא אלהים את כל
 אשר עשה והנה טוב מאד דין הניין לי, יתהון לא הניין לי.

בראשית רבה פרשה ג:ז

'And it was evening and it was morning' is taken by Chazal to indicate that there were many worlds in existence prior to our world, which Hashem subsequently destroyed. Rabbeinu Bachya on Bereishit 1:3 states that this accounts for the mention of the Torah existing 2000 years before the universe

12. שבע שבתות שנים הם שבע שמיטות, רמזו כי יחדש הקב"ה עולמו שבעה פעמים בכל שמיטה פעם אחת, ובכל אחת מהן
 תהיה תוספת טובה והשפעת ברכה משלפניה, כי בהתעלות יום השביעי ישאר חרוב מהנשמות כי יחזיר אותן, ואחרי כן
 יהיה עולם חדש להשפיע נשמות חדשות בלא יצר הרע ובלא זוהמא וטומאה. ושנת מ"ט עצמה היא שמטה ואחריה
 היובל בשנת החמשים

ריקאנטי ויקרא כה:ח

In an idea also found in the Ramban and R' Bachya, the Recanti adopts the concept of recurring cycles of creation, destruction and renewal

Furthermore the pre-creation time is on a different scale entirely, as we see in Iyov 10:5

13. הכימי אנוש ימיד אם שנותיך כימי גבר:
 איוב י"ה

14. אמר רב קטינא: שית אלפי שני הוו עלמא וחד חרוב
 סנהדרין צו.

Chazal tell us that our world exists in a Sabbatical Cycle of 7000 years - 6000 of life and 1000 of destruction

The Sefer Hatemuna - a kabalistic work attributed to the 1C Tanna R. Nechunia ben Hakana states that there is in fact a larger Sabbatical cycle of 7 lots of 7000 years. According to some authorities we are in the seventh such cycle thus there were 42,000 'years' before our world came into being. Rav Yitzchak ben Shmuel of Acco (12C kabbalist) states that all pre-creation years are Divine 'years'. How long is a Divine 'year'?

15. ראיתי לכתוב סוד גדול שראוי להעלימו מאד. דע כי יומו של הקב"ה אלף שנה שלנו שנ' כי אלף שנה בעיניך כיום. ושנתנו שס"ה ימים ורביע יום. א"כ השנה של מעלה הם ג' מאות אלף שנה וחמשת אלפים שנה ור"נ שנה שלנו. ושנתים של מעלה הם ז' מאות אלף שנה וכ"ה אלף שנה ות"ק שנים שלנו. מעתה צא וכפול צא וכפול עד מ"ט אלף שנה, שכל שנה ג' מאות וס"ה יום ורביע יום, וכל יום של מעלה הוא אלף שנה שלנו כמ"ש ונשגב ה' לבדו ביום ההוא מי ימלל גבורות ה'. בשכמל"ו... הנה עינינו רואות

אוצר החיים מאת הרב יצחק דמן עכו

16. **כִּי אֶלֶף שָׁנִים בְּעֵינֶיךָ כַּיּוֹם אֶתְמוּל כִּי יַעֲבֹר וְאַשְׁמוּרָה בְּלִילָה:**

תהלים פרק צ"ד

The passuk in tehillim states that one day to Hashem is like 1,000 years to us. Thus the mekubalim state that since our year is 365.25 days, each Divine year is $1000 \times 365.25 = 365,250$ years

Rabbi Aryeh Kaplan suggested that if this idea is put together with the 42,000 Divine years of the Sabbatical Cycle it comes out that our world is $42,000 \times 365,250$ years old i.e. 15,340,500,000 - around 15 billion, which is the age suggested by science.

17. I am sure that many will find this highly controversial. However it is important know that this opinion exists in our classical literature; moreover that one of the most important kabbalists of 7 centuries ago calculated the age of the universe and came to the same conclusion as modern science

Rabbi Aryeh Kaplan - Immortality, Resurrection and the Age of the Universe pp. 9-10

The general approach, if not the kabalistic calculations, that dinosaurs are remnants of past destroyed world is also supported by the Tiferet Yisrael - Rav Yisrael Lifschitz (1782-1860) and Rav S.R. Hirsch

Questions on this approach

(i) R. Yitzchak of Ako who calculates the Divine Years does not hold that we are in the seventh Sabbatical cycle but the second! So the calculation of 15 billion only works by mixing different opinions in ways which may not be possible

(ii) The whole concept of Sabbatical Cycles is not accepted by many kabbalists

(iii) The Neztiv (Haemek Davar Bereishit 7:23) points out that Chazal state that these prior world were destroyed - so how could traces remain in dinosaur bones

(iv) R Dovid Tzvi Hoffman (late 19C early 20C Germany) objects on the grounds that, according to this theory, the billions of years happened before our creation, then there were 6 cataclysmic days when all the event of Ma'aseh Bereishit happened, then 5770 normal years. There is no evidence for such a cataclysm.

I] APPROACH 6 - THE 6 DAYS ARE REALLY LONGER PERIODS

When the Torah says 'days' could it mean longer periods, even billions of years?

18. **זָכַר לְעוֹלָם בְּרִיתוֹ דְּבַר צְנֹה לְאֶלֶף דּוֹר**

תהלים קה"ח

According to Tehillim, Torah was commanded to the "1000th generation"

19. תניא, אמר רבי שמעון החסיד: אלו תשע מאות ושבעים וארבע דורות שקומטו להיבראות קודם שנברא העולם ולא נבראו, עמד הקדוש ברוך הוא ושתלן בכל דור ודור, והן הן עזי פנים שבדור

חגיגה יג:

According to Chazal these were the 974 generations which were intended to exist before the creation of Man but were not created

20. ולפע"ד שאותן הבני אדם שהיו בעולם הקדום שנקראין פר"א פרפאדעמיטען בל"א (Pre-Adamite), ר"ל הבני אדם שהיו בעולם קדום בריאת אדם הראשון העכשווי, הן הן התתקע"ד דורות שנזכרו בשבת וחגיגה, שהיו נבראים קודם בריאת העולם העתיי

דרוש אור החיים לבעל תפארת ישראל סוף סנהדרין

The Tiferet Yisrael (19C) in an essay at the end of his classical commentary on the Mishnah understands that the 974 generations were humanoid but 'pre-Adamite'

21. Adam was merely the first human being created in the latest cycle. According to these opinions, it would seem that Man already had the physical and mental capacities that we possess as early as 974 generations before Adam, or some 25,000 years ago

Rabbi Aryeh Kaplan - Immortality, Resurrection and the Age of the Universe pp. 21

22. וַיִּצֶר ה' אֱלֹהִים אֶת הָאָדָם עֹפָר מִן הָאֲדָמָה וַיִּפַּח בְּאַפָּיו נְשָׁמַת חַיִּים וַיְהִי הָאָדָם לְנֶפֶשׁ חַיָּה

בראשית ב:ז

Adam was created from two sources - (i) dust from the ground and (ii) the Breath of G-d

23. ויפח באפיו נשמת חיים. נפש חיונית מוכנת לקבל "צלם אלהים", כאמרו ונשמת שדי תבינם (איוב לב, ח). מכל מקום ויהי האדם לנפש חיה. היה עם כל זה "חיה" בלבד, בלתי מדברת, עד שנברא בצלם ודמות

ספורנו שם

Seforno (Italy 16C) understands that before Man could receive the Tzelem Elokim and become truly human, he first had to be prepared by the infusion of the Breath of G-d - a life force which gave intelligence. Nevertheless, he still remained a Nefesh Chaya until the Tzelem Elokim was given

24.

רש"י ע"ג ב"ר יד ה ופר"א יב. נשמת חיים. היא נפש חיונית, שהיא נשמת שדי, הנאפשרת לו להתבונן, וזה מה שנפח בו מתהלה, והיא תהכנת בכח לקבל "צלם אלקיב", כמו שכבר אמר למעלה (א, כו) — (כו) ושתו הפרשיות משלימות זו את זו, ואין כפל שלא לצורך. וכשהניחו בגן עדן, שם קיבל את "צלם אלקיב", כי בתחלת ברייתו היה רק נפש חיה בלבד.

ספורנו שם הוצאת מוסד הרב - עם פ' של ר' אברהם זרום

See this commentary on the Seforno who understands that this pre-Tzelem state of proto-Man was before he was taken into Gan Eden

25. ואם היה מצטרך בעל תורה להאמין ולהודות בהיולי קדמון ועולמות רבים קודם העולם הזה, לא היה בזה פגם באמונתו, כי העולם הזה הוא חדש מזמן ידוע ותחלת האדם אדם ונת.

ספר הכוזרי מאמר א אות סז

The Kuzari state that belief in a physical existence prior to the Creation of Adam and Noach is not a flaw in the Jewish concept of Emunah (although he does not state such a belief to be correct)

26. ודע, כי הימים הנזכרים במעשה בראשית היו בבריאת השמים והארץ ימים ממש, מחוברים משעות ורגעים, והיו ששה כששת ימי המעשה, כפשוטו של מקרא

רמב"ן בראשית פרק א פסוק ג

The Ramban states unequivocally that the 6 days of creation are actual days

27. ויקרא אלקים לאור יום ולחשך קרא לילה ויהי ערב ויהי בקר יום אחד

בראשית א:ה

However it is clear that the Torah uses the word day in different ways - here in the same passuk it means the hours of light and then the full day

28. אלה תולדות השמים והארץ בהבראם ביום עשות ה' אלקים ארץ ושמים

בראשית ב:ד

Here the Torah refers to the 'day' on which Hashem created the world. Which day is this? Rashi says it refers to the first day. But Rav Avraham ben HaRambam explains it to mean the period of the six days of creation. He explains that 'day' can mean an extended period of time. He refers to a passuk in Devarim

29. כל המצוה אשר אנכי מצוה היום תשמרון לעשות למען תחיו ורבייתם ובראתם וירשתם את הארץ אשר נשבע ה' לאבותיכם:

דברים ח:א

When the Torah refers to mitzvot that Hashem is teaching 'hayom' - today - it means over the whole 40 years in the desert

Rav Eli Munk (Paris mid 20C) writes that until day 4 there was no sun in the sky and, as such, there can be no meaning to a 24 hour day on days 1,2 and 3. But were days 4,5 and 6 real 24 days?

30. להבדיל בין היום ובין הלילה - משגגנו האור הראשון, אבל בשצעת ימי בראשית שמשו האור והחושך הראשונים יחד זין ביום ובין זלילה:

רש"י בראשית פרק א פסוק יד

Rashi points out (Bereishit 1:14) that the time system of all 6 days of creation was the same. So there are grounds to say that each of the 6 days was not 24 hrs

31. In many places and especially in the Zohar it is proven that the expression 'day' as it appears in the account of creation is not to be understood as an ordinary human day of 24 hours but rather the intent is to the day of G-d which lasts 1000 years - that is to say a day that lasts for an undefined length of time

Rabbi Dovid Tzvi Hoffman - Commentary to Genesis p48

Questions on this approach

(i) R. Shimon Schwab asks - if the first 6 days were really aeons, how can it be that the first Shabbat was a real day so as to give us our current Shabbat. Some answer that we can never understand precisely how 'G-d rested on the seventh day' and that we count days differently afterwards (R. Dovid Tzvi Hoffman)

(ii) We do not see any indication in the Rishonim of 6 days being 15 billion years (although we do see that a day means more than 24 hrs)

(iii) The Torah does not say '6 days' but 'and it was evening, and it was morning'. If a days is millions of years, what do 'evening' and 'morning' mean

(iv) Even if the days are billions of years, there are events in the creation which have no clear correlation to the scientific understanding e.g. what is the 'rakia' on day 2? What is the water above and below the rakia.

(v) The order of creation in Bereishit does not correspond to the scientific understanding e.g. the sun and moon were placed in position on day four after vegetation and trees. (Some have tried to explain that day four is not the placement of the sun but the fixing of the lengths of the orbits or the transparency of the atmosphere)

Day 1 - Heavens, Earth, Water, Light	-	14 billion yrs ago: Big Bang
Day 2 - Firmament separating waters	-	4.5 billion yrs ago: Formation of Earth (day 1) and moon and sun (day 4)
Day 3 - Dry land, vegetation, trees	-	500 million years ago ("mya"): Fish (day 5) 438 mya: Land plants (day 3) 434 mya: Land insects (day 6)
Day 4 - Sun, moon, stars	-	400 mya: Flying Insects (day 5) 360 mya: Trees (day 3)
Day 5 - Fish, birds and flying insects	-	300 mya: Land reptiles (day 6) 200 mya: Land mammals (day 6)
Day 6 - Land mammals, insects and reptiles	-	150 mya: Birds (day 2)

Some have tried to make them fit but such interpretations risk becoming speculative or forced

J] APPROACH 7 - THE 6 'DAYS' ARE NOT MEANT TO BE CHRONOLOGICAL AT ALL!

32. בְּרֵאשִׁית בָּרָא אֱלֹהִים אֶת הַשָּׁמַיִם וְאֶת הָאָרֶץ:

בראשית פרק א פסוק א

33. בראשית ברא - אין המקרא הזה אומר אלא דרשני, כמו שדרשוהו רבותינו ז"ל בשביל התורה שנקראת (משלי ח כב) ראשית דרכו, ובשביל ישראל שנקראו (ירמיה ב ג) ראשית תבואתו. ואם באת לפרשו כפשוטו כך פרשוהו בראשית בריאת שמים וארץ והארץ היתה תהו ובהו וחשך ויאמר אלהים יהי אור. **ולא בא המקרא להורות סדר הבריאה לומר שאלו קדמו, שאם בא להורות כך, היה לו לכתוב בראשונה ברא את השמים וגו'.....**

רש"י בראשית א:א

34. בראשית - אמר רבי יצחק לא היה צריך להתחיל את התורה אלא (שמות יב:ב) **מהחודש הזה לכם**, שהיא מצוה ראשונה שנצטוו בה ישראל, ומה טעם פתח בבראשית, משום (תהלים קיא:ו) **כח מעשיו הגיד לעמו לתת להם נחלת גוים**, שאם יאמרו אומות העולם לישראל לסטים אתם, שכבשתם ארצות שבעה גוים, הם אומרים להם כל הארץ של הקב"ה היא, הוא בראה ונתנה לאשר ישר בעיניו, ברצונו נתנה להם וברצונו נטלה מהם ונתנה לנו:

רש"י בראשית פרק א פסוק א

In a famous Rashi, we see that the Torah is NOT coming to give a chronology of physical creation but an account of moral creation - WHY the world was created and not HOW!

The Rambam in Moreh Nevuchim (2:30) explains that all creation happened in the first instant (also the view of Rashi and Ramban) and the 6 days were a process of distinguishing one thing from the other. The Abarbanel (Spain 15C) gives an explanation of the Rambam's view (although he strongly disagrees with it!)

35. **The Rambam believed that there were not separate creative acts on 6 days but rather everything was created on one day in a single instant. In the work of Creation there is mention of '6 days' to indicate the different levels of created beings according to their natural hierarchy; not that there were actual days, nor that there was a chronological sequence to that which was created in the acts of Genesis This is the view of the Rambam which he considered as one of the major secrets of the Creation. He tried to conceal this view but ... other commentators uncovered his secret and publicized his view.**

Abarbanel, Commentary on Bereishit, pp10-11

The Rambam and the Ralbag explain Bereishit not as a physical description of the creation of the universe but as a theological description of the relative orders of species and creations in the spiritual world.

36. ודע, כי הימים הנזכרים במעשה בראשית היו בבריאת השמים והארץ ימים ממש, מחוברים משעות ורגעים, והיו ששה כששת ימי המעשה, כפשוטו של מקרא: ובפנימיות הענין יקראו "ימים" הספירות האצולות מעליון, כי כל מאמר פועל הויה תקרא "יום". והיו ששה, כי לה' הגדולה והגבורה, והמאמרים עשרה, כי הראשונות אין שם "יום" נתפס בהם. והפירוש בסדור הכתובים בזה נשגב ונעלם, ודעתנו בו פחות מטפה מן הים הגדול:

רמב"ן בראשית פרק א פסוק ג

After explaining that the 6 days are 6 real 24-hr days, the Ramban then goes on to explain that what is being described in Bereishit is a deep mystical idea, not a simple physical act

37. All that the Torah recounts of matters relating to the period before the completion of creation is conveyed to us by Moshe from the mouth of G-d in terms of concepts which we can grasp. Just as one attempts to give a blind man some idea of that which he cannot see by making use of analogies with the sense of touch and so forth, so does the Torah present to us that which is essentially spiritual in a material guise, with some points of similarity and analogy to the spiritual message, so that we may be able to grasp it to the best of our ability

We see from this [explanation of the Ramban] that in the simple meaning of the text - that which is conveyed to us in accordance with our own conceptual capacity - we are to understand actual days made up of hours and minutes. But in its real essence, that is to say in its inner meaning, the text has quite a different connotation. It refers to the 6 sefiros, which are modes of revelation of the divine conduct of the world. Only for our benefit does Scripture present them to us in the form of 6 days. As for the relevance of the six days in their allusion to the six modes of revelation - this is something sublime and concealed from us, as the Ramban says

Michtav Me'Eliyahu Vol II p151

Ma'aseh Bereishit is a deep mystical concept and to trivialise it by trying to fit it with science, is, ultimately, a unnecessary exercise

38. Creation, by definition, is outside our world and outside our frame of thought. If time exists only as a mode of our thought, then the act of creation is necessarily non-temporal - "above time". Every non-temporal act is interpreted in our frame of thought as an infinite time-sequence. This is the reason why creation is interpreted by scientists as a process of evolution extending over vast aeons of time.

Since creation does not take place in time, we must ask why the Torah describes it as taking 6 days. The answer is that the Torah wishes to teach us a lesson in **relative values**. Everything has value only in relation to its spiritual content. Vast physical masses and vast expanses of space and time are of little significance if their spiritual content is small. The whole physical universe exists as an environment to the spiritual life of the human being; this is its spiritual content. When interpreting non-temporal creation in temporal terms, the Torah deliberately contracts the time-scale compared with that which presents itself to the scientist, in order to convey to us the relative insignificance of the material creation compared with the spiritual stature of man

Rav Dessler, Collected Essays and Notes, London 5719 n.33

39. Everyone knows that here, if anywhere, is the realm of parable, allegory and allusion. In these most profound matters people are willing to accept that the true meaning lies on the mystical plane, far above what is apparent to the superficial eye. People do find difficulty however in holding within one spiritual context two apparently conflicting approaches to creation. On the one hand, there are their previous simpler, and in a sense less demanding, thought-patterns in which creation is characterized by sudden discontinuities. On the other, there is the unfamiliar, but increasingly popular, conception of the gradual unfolding of all things within an evolutionary context.

.... The essential need of the hour is therefore an educational effort to propagate the broader view, the grander and more refined conception that we have alluded to above. The coarser-textured faith, in the unrefined form in which it is so often presented, can no longer maintain its position

Rav Avraham Isaac Hacohen Kook - Orot Hakodesh p559

40. Before we open the Torah however, let us consider how to read it. As a subject of philological or antiquarian research? As corroboration for antediluvian or geological hypotheses? In the expectation of finding revelations of esoteric mysteries? Certainly not! As **Jews** we will read this book, as a book tendered to us by God in order that we learn from it about what we are and what we should be during our earthly existence. **We will read it as Torah - literally instruction - directing and guiding us within G-d's world and among humanity, making our inner self come alive**

Rav S.R. Hirsch - 19 Letters, Letter 2